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June 27, 2000

Docket No.: 50-348

NEL-00-0169

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Joseph M. Farley Nuclear Plant – Unit 1  
Licensee Event Report 2000-006-00  
Reactor Trip From 4% Power Due to Personnel Error

Ladies and Gentlemen:

Joseph M. Farley Nuclear Plant – Unit 1 Licensee Event Report (LER) No. 2000-006-00 is being submitted in accordance with 50.73(a)(2)(iv). There are no NRC commitments in the LER.

If you have any questions, please advise.

Respectfully submitted,

  
Dave Morey

CHM/maf: ex4pwr.doc  
Attachment

IE22

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U. S. Nuclear Regulatory Commission

cc: Southern Nuclear Operating Company  
Mr. L. M. Stinson, General Manager – Farley

U. S. Nuclear Regulatory Commission, Washington, D. C.  
Mr. L. M. Padovan, Licensing Project Manager – Farley

U. S. Nuclear Regulatory Commission, Region II  
Mr. L. A. Reyes, Regional Administrator  
Mr. T. P. Johnson, Senior Resident Inspector – Farley

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)

Joseph M. Farley Nuclear Plant - Unit 1

DOCKET NUMBER (2)

0 5 0 0 0 3 4 8

PAGE (3)

1 OF 5

TITLE (4)

Reactor Trip from 4% Power Due to Personnel Error

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
0 5	28	2000	2000	006	00	06	27	2000		0 5 0 0 0
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)										
OPERATING MODE (9)		2		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(vii)
POWER LEVEL (10)		0 0 4		20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
				20.2203(a)(2)(i)		20.2033(a)(3)(ii)		50.73(a)(2)(iii)		73.71
				20.2203(a)(2)(ii)		20.2033(a)(4)		X 50.73(a)(2)(iv)		OTHER
				20.2203(a)(2)(iii)		50.38(c)(1)		50.73(a)(2)(v)		Specify in Abstract below
				20.2203(a)(2)(iv)		50.38(c)(2)		50.73(a)(2)(vii)		or in NRC Form 366A

NAME

L. M. Stinson, General Manager Nuclear Plant

TELEPHONE NUMBER (include area code)

3 3 4 - 8 9 9 - 5 1 5 6

## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

## SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-space typewritten lines) (16)

On May 28, 2000 at 0545, with the reactor at 4% power, Unit 1 experienced an automatic reactor trip due to steam generator (SG) level reaching the low-low (lo-lo) level trip setpoint. At 0259 with the reactor at 14% power, the main turbine was manually tripped as part of planned maintenance to perform balancing. The turbine did not stop rolling as expected, and the decision was made to cycle the main turbine governor valves (GVs) to attempt to stop the turbine. The GV's were opened slightly in Turbine Manual mode, and then manually tripped. Following the turbine trip, low electrohydraulic (EH) control fluid pressure resulted in the only running steam generator feed pump (SGFP) losing speed and providing insufficient flow. The EH system is common to the SGFP turbines and the main turbine. Auxiliary feedwater (AFW) pumps were started and reactor power was rapidly reduced in accordance with plant procedures. SG levels had been stabilized with reactor power at 4% when cooldown caused the steam dumps to close. The resulting SG level shrink caused an automatic reactor trip on lo-lo SG level.

This event was caused by personnel error in that: 1) the governor valve cycling evolution was performed with inappropriate procedural guidance selection and use of Turbine Manual mode when Operator-Auto mode was the appropriate method; and 2) a prior software change to the turbine control system was prepared with inadequate documentation of its operational impact, leading to an inadequate procedure for operation in Turbine Manual mode.

The event will be discussed with all licensed personnel, and all licensed personnel will be retrained on procedure use expectations by July 31, 2000. Personnel responsible for the digital electrohydraulic control (DEHC) system and software will be trained on expectations for software change package documentation by July 31, 2000. Applicable operating procedures have been changed to reflect the changed response of the EH system to a turbine trip when in Turbine Manual mode. Recent changes to DEHC software have been reviewed for additional operational impact and appropriate procedure changes have been made.

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TEXT (If more space is required, use additional copies of NRC Form 366A)(17)

Westinghouse -- Pressurized Water Reactor  
Energy Industry Identification Codes are identified in the text as [XX].

Description of Event

Prior to this event, in 1995, a software change was made to the digital electrohydraulic control (DEHC) system to reduce its vulnerability to momentary electrical spikes and transients. The previous software had included a function to reset the valve position demand to zero following a turbine trip. The 1995 change included removal of this function in Turbine Manual mode. Therefore, the governor valves would have an open demand signal present following a turbine trip in Turbine Manual mode. This signal would create a demand for electrohydraulic (EH) fluid [TG] under these conditions.

Following the return to service from a refueling outage, the main turbine [TA] was exhibiting a higher than expected vibration. At 0259 with the reactor at 14% power, the turbine was tripped in order to perform a balance move.

Normally, the turbine should coast to a stop about an hour after being tripped. However, the turbine slowed to approximately 20 rpm and stabilized. The decision was made to open the governor valves (GVs)[TA] approximately 3% and to re-close the GVs, to attempt to stop the turbine roll.

At 0534, the main turbine was latched (in Operator-Auto mode) and switched to Turbine Manual mode by the operator. This selection of Turbine Manual mode was inappropriate in that the procedure does not provide for voluntary entry into Turbine Manual mode. Normal practice is to use only Operator-Auto mode for this activity. Procedural guidance for use of Turbine Manual mode was intended to apply for failure of Operator-Auto mode, when entry into Turbine Manual mode is forced. Operator selection of Turbine Manual mode is contrary to station expectations and requirements for procedural adherence. No problems were observed with EH fluid [TG] pressure at this time. The governor valves were opened approximately 3% from the closed position in Turbine-Manual mode. The turbine was then manually tripped again at 0538. Following the turbine trip, due to the software change, the governor valve demand position remained at 3% with actual valve position closed. This condition placed a demand on the EH fluid system in excess of the EH pump capacity. EH pressure decreased below the point at which main feed pump operation could be supported.

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TEXT (If more space is required, use additional copies of NRC Form 366A)(17)

Following the turbine trip, the steam flow greater than feed flow mismatch alarms annunciated and the operating main feed pump rolled back to ~ 2500 rpm. The operators began a rapid power reduction, starting all auxiliary feedwater (AFW)[BA] pumps to assist with steam generator level recovery and inserting control rods. Power was reduced to slightly less than 4% prior to the automatic reactor trip at 0545.

As reactor power approached 4%, steam generator levels began to stabilize. Throughout the transient, the turbine bypass valves (steam dumps)[SB] continued to operate normally in steam pressure control mode [JI], but automatically closed per design when the low reactor coolant temperature interlock (P-12) setpoint was reached. Following the steam dump closure at the P-12 setpoint, steam generator levels decreased due to the shrink effect. About five seconds after the P-12 setpoint was reached and before the reactor could be manually tripped, an automatic reactor trip occurred due to 1C steam generator lo-lo level.

### Cause of Event

This event was caused by personnel error in that: 1) the governor valve cycling evolution was performed with inappropriate procedural guidance selection and use; and 2) a prior software change to the turbine control system was prepared with inadequate documentation in the design change summary for operational impact, leading to an inadequate procedure for operation in Turbine Manual mode.

1) The normal technique not involving use of Turbine Manual was possible within existing procedural guidance, but it was not used. The governor valves could have been opened 3% using the valve position limiter in Operator-Auto mode. Procedural guidance for use of Turbine Manual mode was intended to apply only for failure of Operator-Auto mode, when entry into Turbine Manual mode is forced. Use of the procedure in this manner was contrary to station expectations and requirements for procedure adherence.

2) The software change package design change summary did not clearly identify the effect of the change on Turbine Manual mode of operation. Consequently personnel responsible for revisions to operations procedures and operator training materials did not recognize that Turbine Manual operation was affected by the change. Therefore, operations personnel were unaware that a turbine trip while in Turbine Manual mode would result in an excessive EH fluid demand on the EH system, such that the EH system could not support main feed pump operation with the main turbine tripped.

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TEXT (If more space is required, use additional copies of NRC Form 366A)(17)

Safety Assessment

All safety systems functioned as designed during this event. There was no abnormal release of radioactive material during this event; therefore, the health and safety of the public were unaffected by this event.

Since all safety systems functioned as designed, this event does not represent a Safety System Functional Failure.

Corrective Action

The event will be discussed with all licensed personnel, and all licensed personnel will be retrained on procedure use expectations by July 31, 2000.

Personnel responsible for the DEHC system and software will be trained on expectations for software change package documentation by July 31, 2000.

Applicable operating procedures have been changed to reflect the changed response of the EH system to a trip in Turbine Manual.

Recent changes to DEHC software have been reviewed for additional operational impact and appropriate procedure changes have been made.

Operator training materials will be revised to reflect the changed response of the EH system to a trip in Turbine Manual by July 31, 2000.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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		2 0 0 0	- 0 0 6	- 0 0		

TEXT (If more space is required, use additional copies of NRC Form 366A)(17)

Additional Information

The software change which led to the transient described in this report was part of a package implemented as corrective action to a December 1994 reactor trip on Unit 2. See Unit 2 LER 94-04-00. The potential for an EH transient such as described in this report was an unanticipated effect of this change.

The following LERs have been submitted in the past 2 years on personnel error on procedure adherence:

LER 2000-004-00, Unit 1, Three Spent Fuel Assemblies in Spent Fuel Pool Locations Not Allowed by Technical Specification 3.7.15;

LER 2000-002-00, Unit 1, Unplanned Auxiliary Feedwater Actuation Upon Shutdown of Both Steam Generator Feed Pumps;

LER 1999-003-00, Shared, Control Room Ventilation Radiation Monitors Inoperable; and

LER 1999-001-00, Unit 1, 4160 Volt Breaker In a Non-Seismically Racked-Out Condition.